

CLAIMS

1. An electrolyte membrane comprising a porous substrate, wherein pores of the porous substrate are filled with a first polymer having proton conductivity, and the porous substrate is comprised of i) a second polymer which is at least one selected from the group of polyolefins, and ii) a third polymer having a double bond in the molecule of the third polymer, and the porous substrate comprises a crosslinked second polymer wherein the second polymers are crosslinked with one another.

2. The electrolyte membrane according to claim 1, wherein said third polymer is at least one of polymers having an alicyclic skeleton structure and polybutadiene.

3. The electrolyte membrane according to claim 1 or 2, wherein said third polymer is polynorbornene.

4. The electrolyte membrane according to any one of claims 1 to 3, wherein said second polymer comprises polyethylene:

5. The electrolyte membrane according to any one of claims 1 to 4, wherein said second polymer is polyethylene and said third polymer is polynorbornene.

6. The electrolyte membrane according to any one of claims 1 to 5, wherein one end of said first polymer is bound to surface of pores of said porous substrate.

7. The electrolyte membrane according to any one of claims 1 to 6, wherein pores of the porous substrate are further filled with forth polymer having proton conductivity.

8. A fuel cell comprising said electrolyte membrane according to any one of claims 1 to 7.

9. A solid polymer fuel cell comprising said electrolyte membrane according to any one of claims 1 to 7.

10. A direct methanol solid polymer fuel cell comprising said electrolyte membrane according to any one of claims 1 to 7.